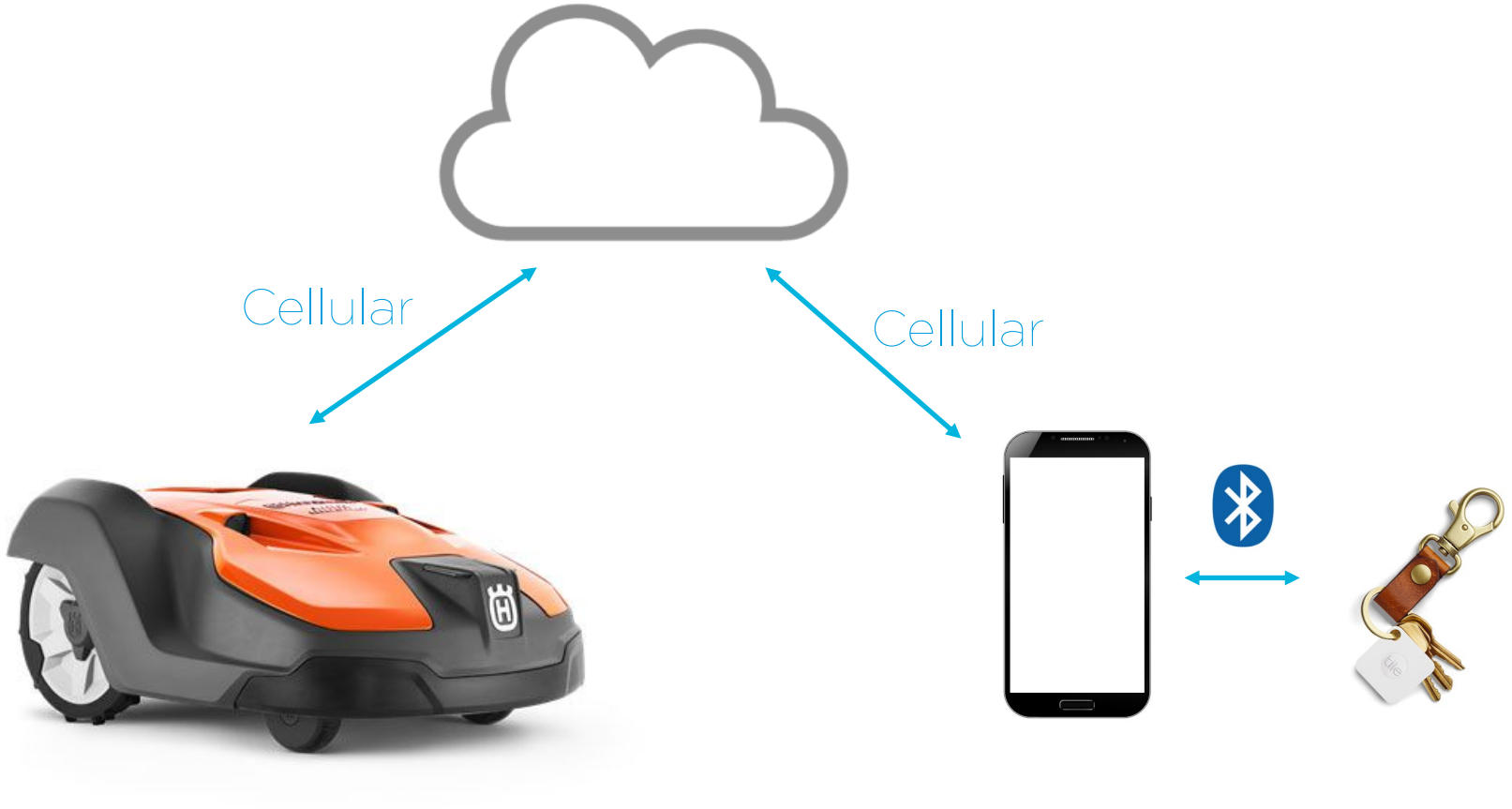
A WORLD OF CONNECTIVITY

FOR IoT SOLUTIONS

Thomas Soederholm

Director of Business Development

ANT Symposium 2019

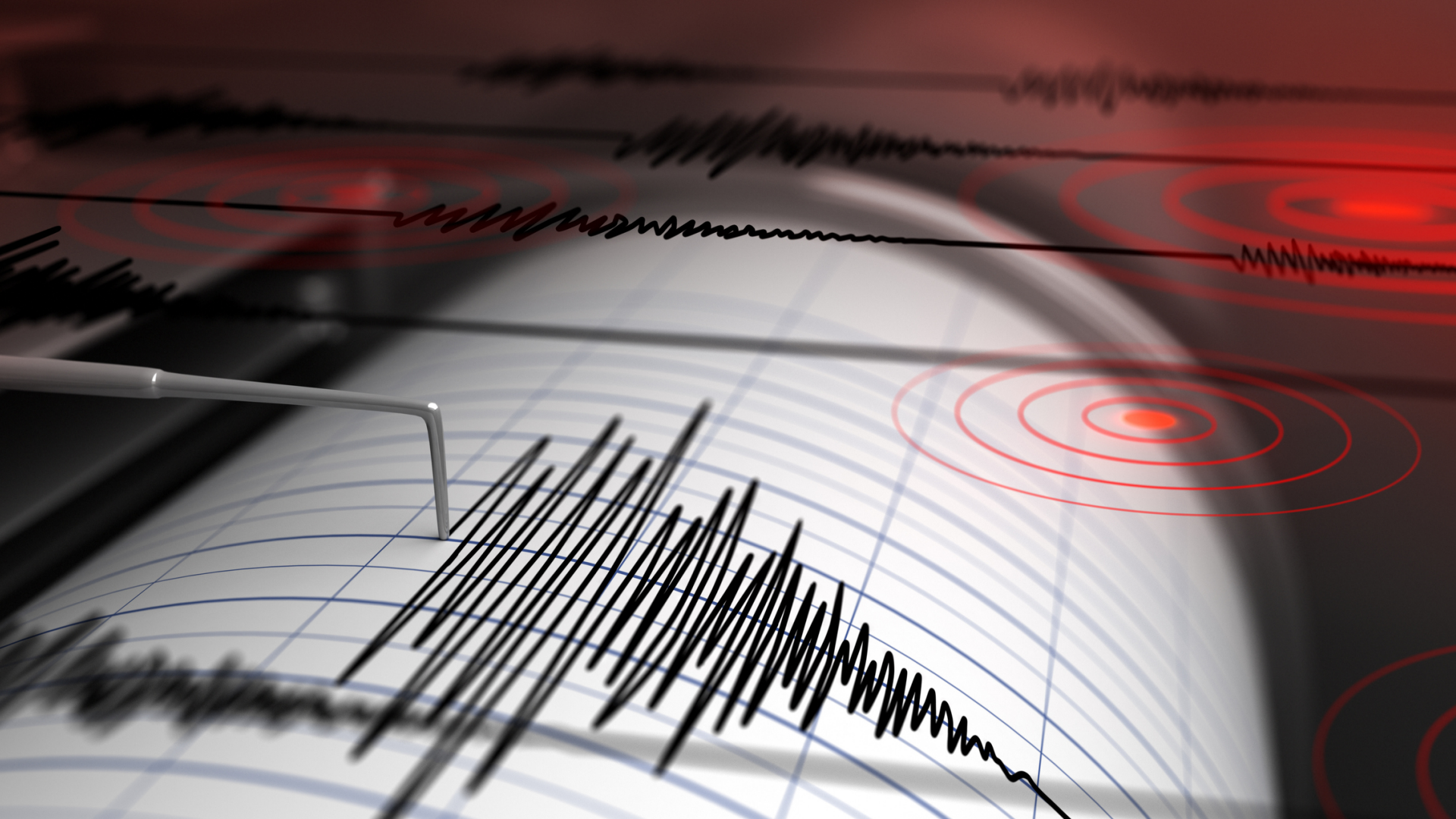

Cellular
Cellular

Remote maintenance

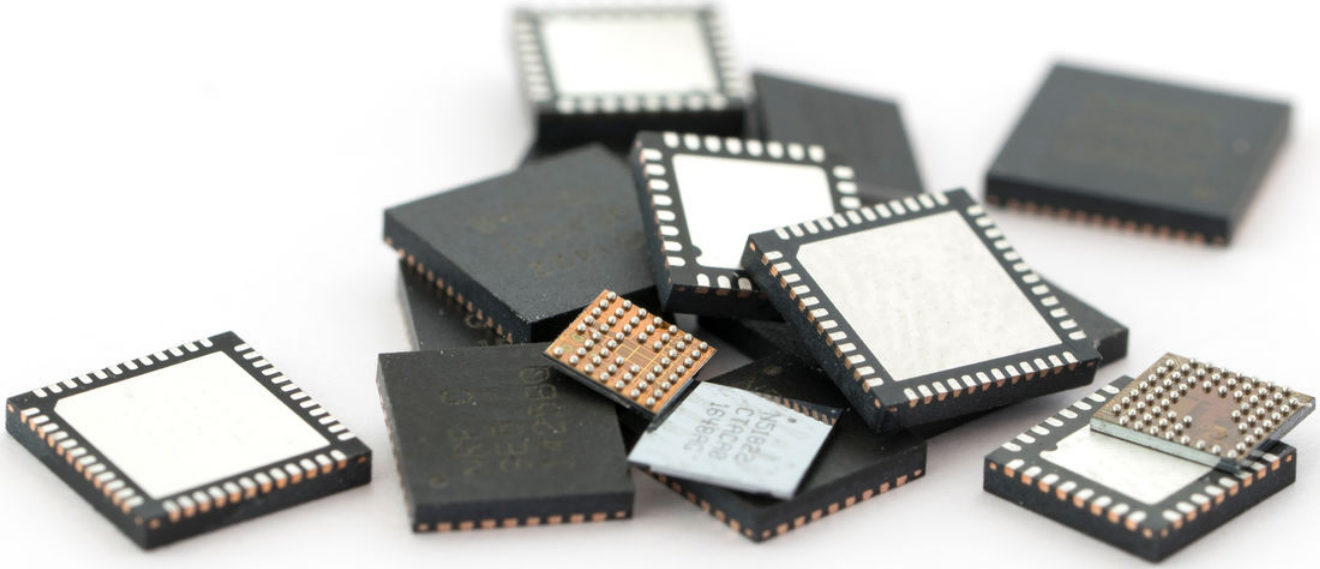
Remote access control

BIG DATA

Cloud analytics




2G
LoRa®
Wi Fi
sigfox
3G
THREAD
ZigBee®
NB-IoT™
Bluetooth™
ANT+
LTE-M

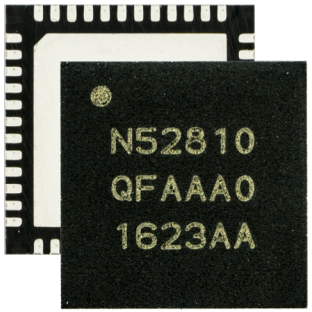


NORDIC SEMICONDUCTOR


nRF
52
SERIES

Low end

nRF52810



ARM Cortex M4

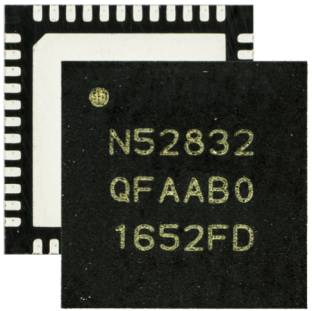
192 kB Flash

24 kB RAM

ANT - Bluetooth 5

Mid end

nRF52832



ARM Cortex M4F

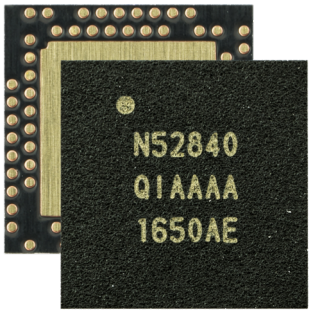
512 kB Flash

64 kB RAM

ANT - Bluetooth 5

High end

nRF52840



ARM Cortex M4F + Cryptocell

1024 kB Flash

256 kB RAM

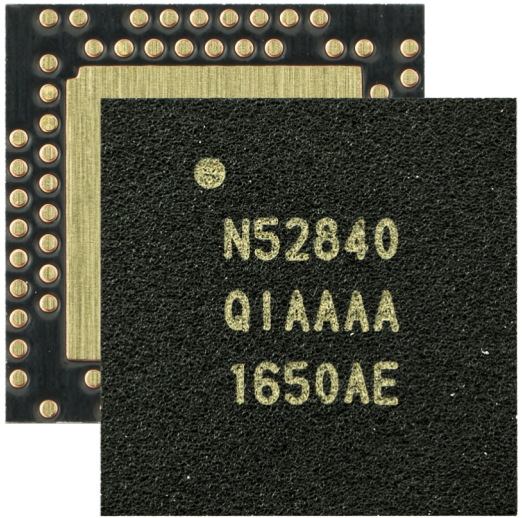
ANT - Bluetooth 5

802.15.4 – Thread - Zigbee

nRF52840

PROPRIETARY

2.4GHz



THREAD

ZigBee®

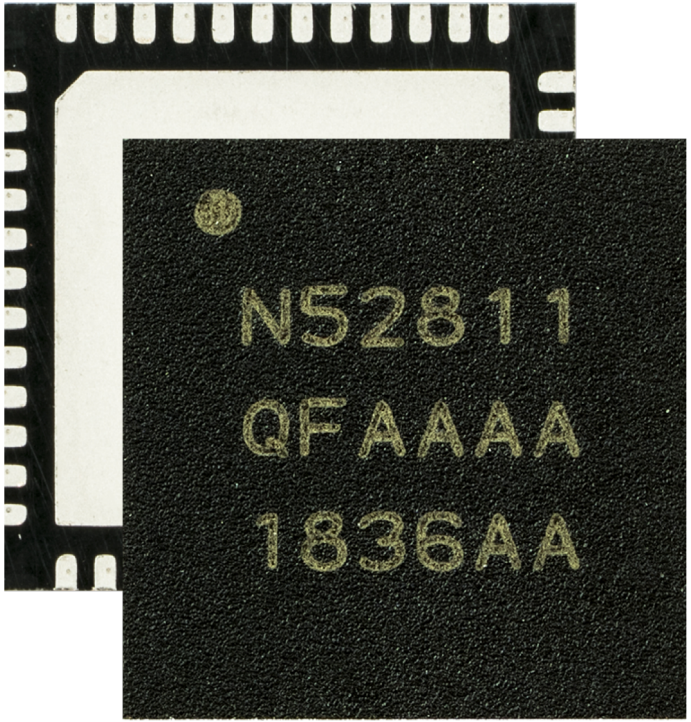
802.15.4

LONG RANGE

802.15.4

LONG RANGE

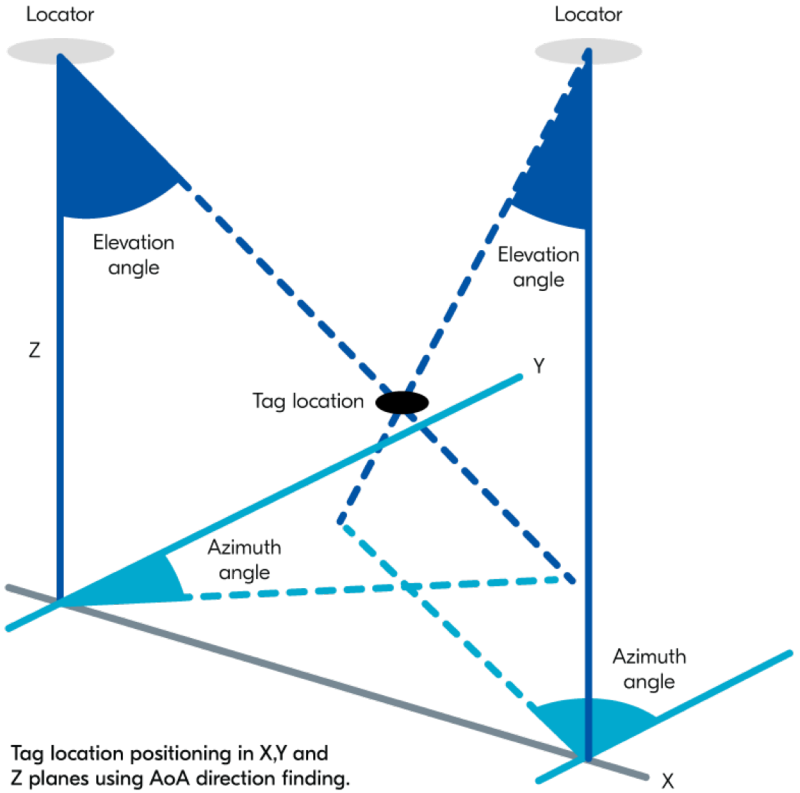
nRF52811 – Entry level SoC



- ARM Cortex M4
- 192 kB Flash
- 24 kB RAM
- Bluetooth 5 Long range
- 802.15.4 – Thread

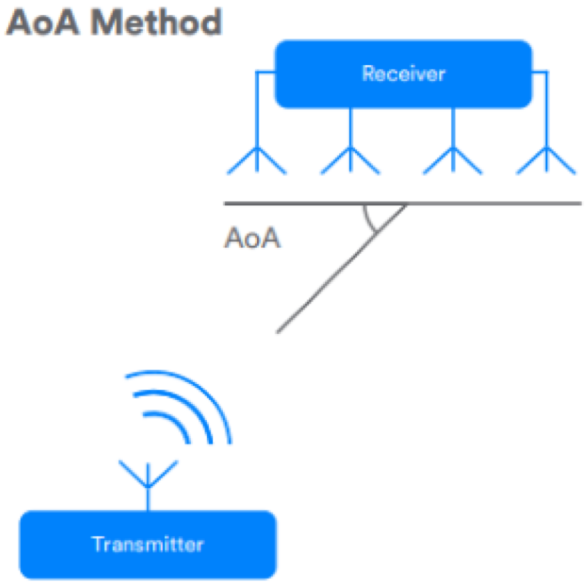

Bluetooth®
5.1

Direction finding

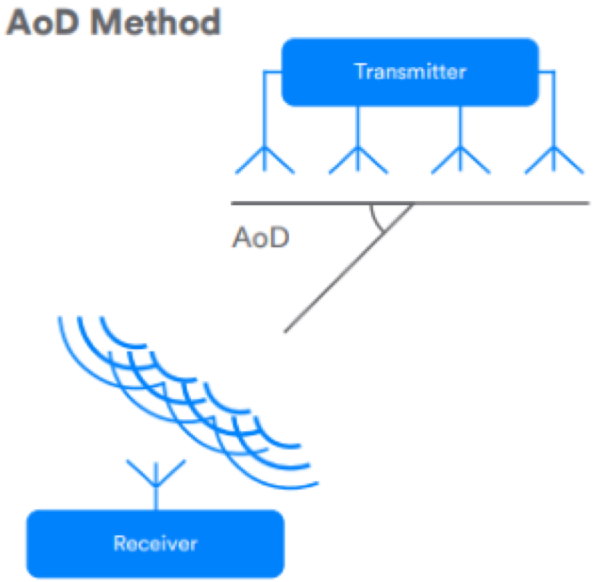


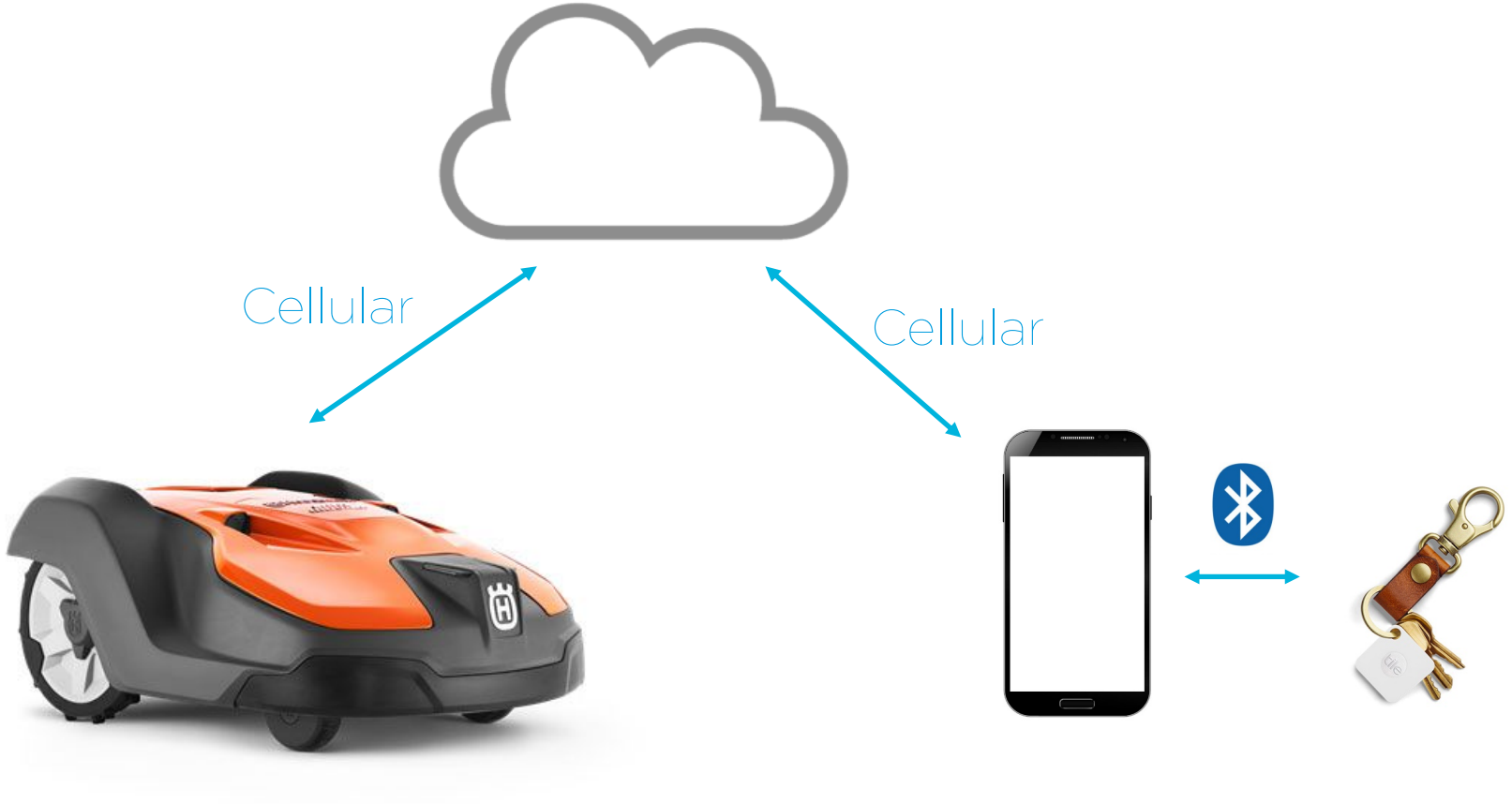
Tag location positioning in X,Y and Z planes using AoA direction finding.

Angle of Arrival (AoA)



Angle of Departure (AoD)




Cellular
Cellular


amazon


LTE-M

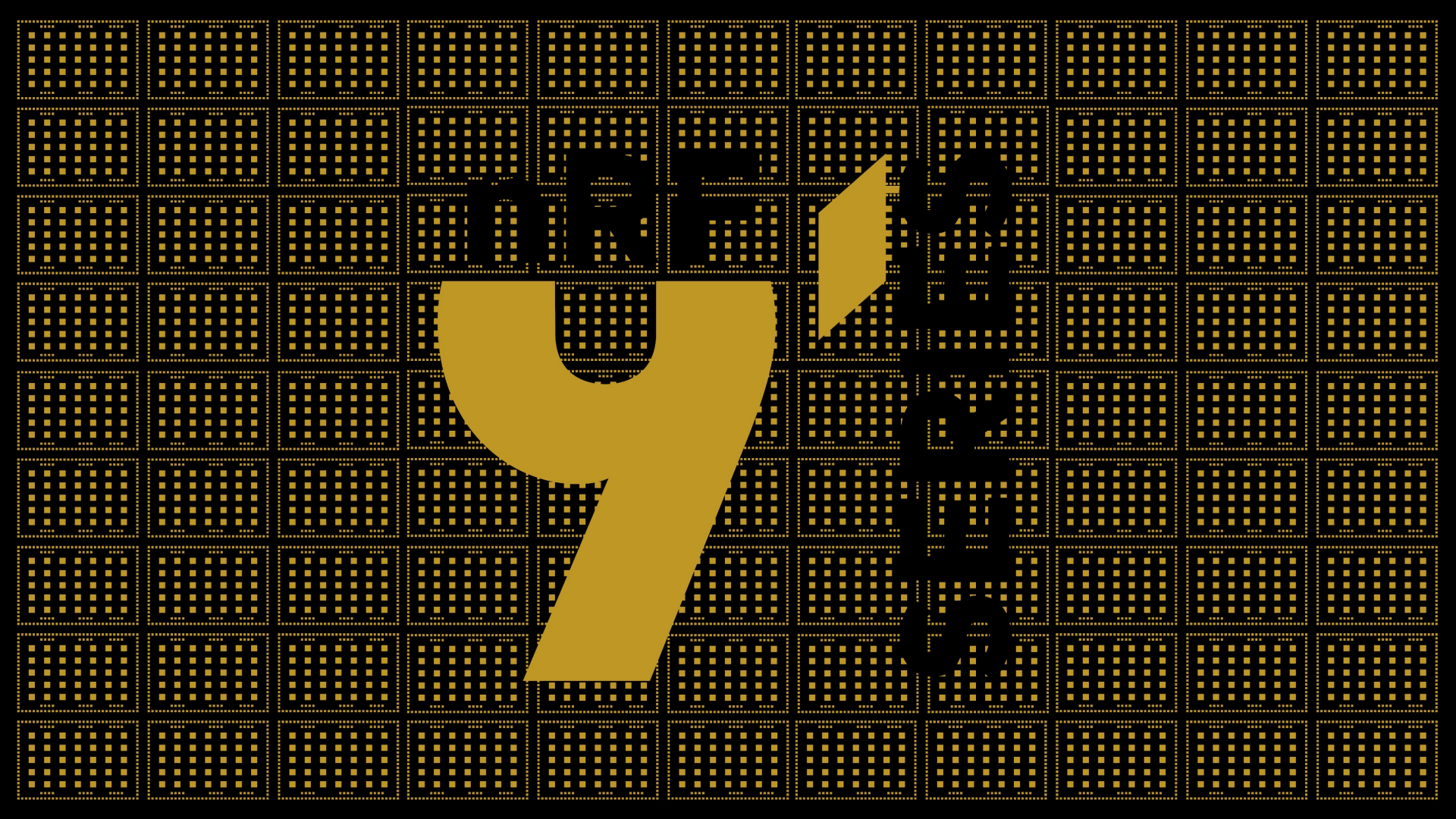

NB-IoT™

Low Power LTE Technologies

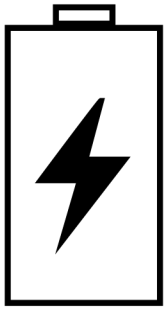
Low-medium throughput – up to 375 kB/s for LTE-M

Long range – up to 7x traditional LTE for NB-IoT

Long battery life – up to 15 years



Low Power



Built from scratch for low power operation

Integration

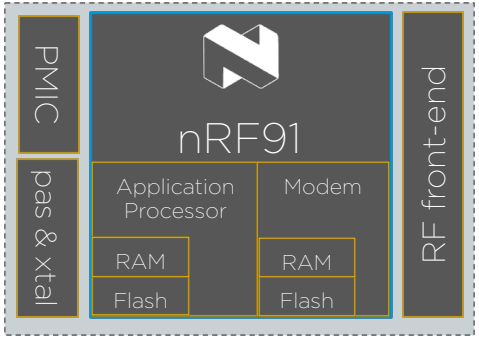
Advanced packaging techniques to reduce solution size

Ease of Use

Enable self-service for thousands of customers and hundreds of applications

nRF9160

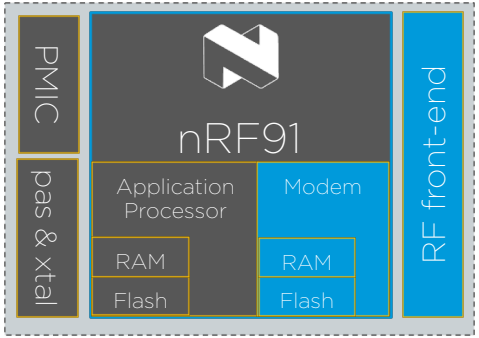
- Fully integrated SoC for cIoT
- Modem with integrated RFFE and power management
- CPU core and memory exclusively for application
- Pre-certified for world wide operation



nRF9160 10x16x1 mm SiP

Low Power Modem

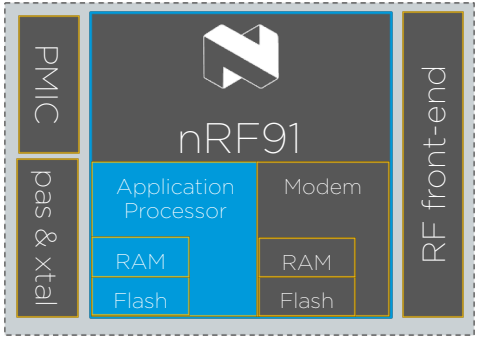
- Low power operation
- LTE-M and NB-IoT modem FW
- Best-in-class coverage
- World-wide operation
- GPS
- IPv4/IPv6, TCP/UDP, TLS/DTLS
- 50Ω antenna pin interface
- Supports any SIM or eSIM



nRF9160 10x16x1 mm SiP

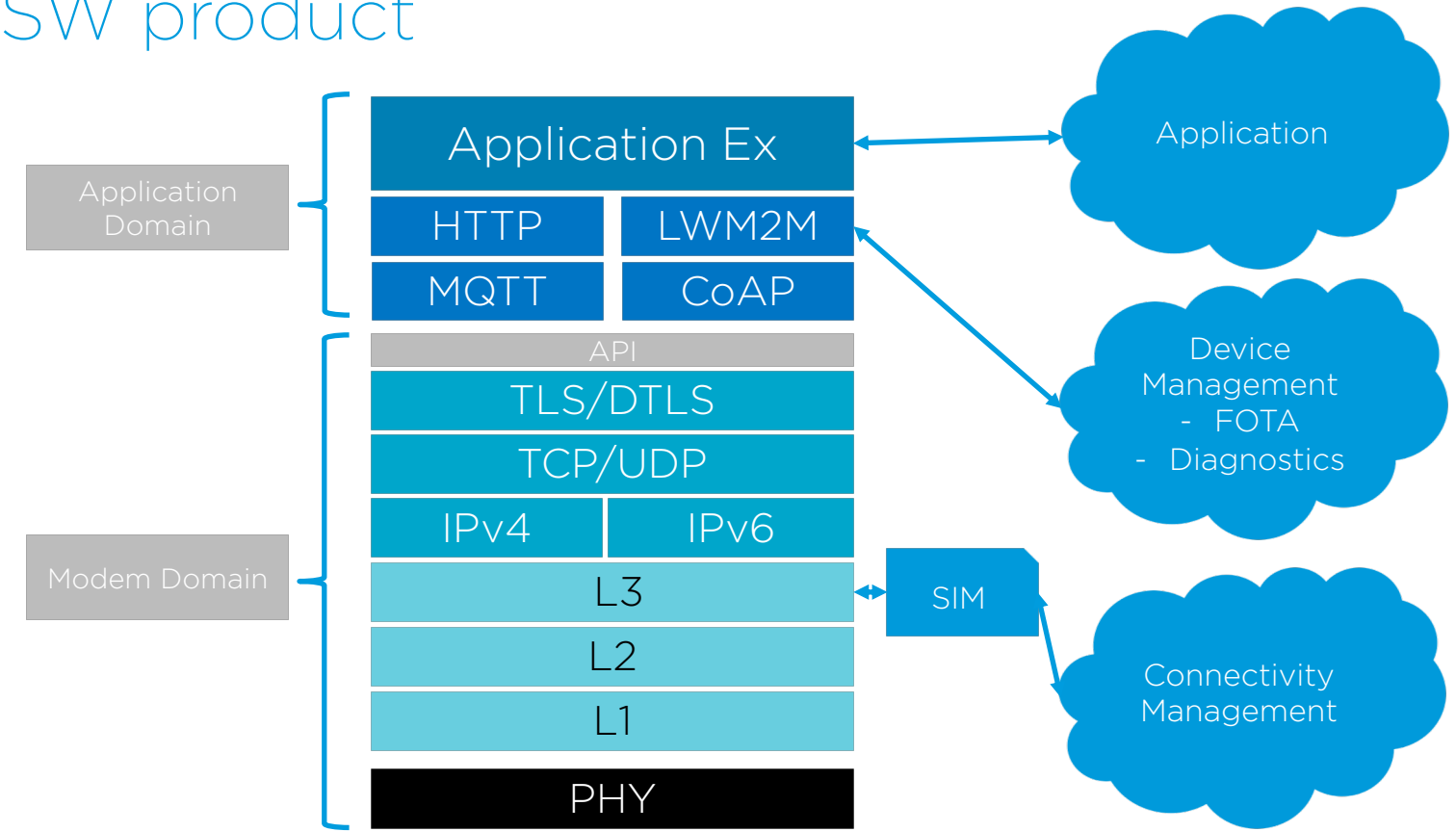
Application Processor

- 64 MHz ARM® Cortex® -M33 CPU
- ARM® Trustzone® to prevent over-the-air attacks
- ARM® Cryptocell 310 for application-level security
- 1 MB flash, 256 kB RAM
- 4x(SPI/UART/I2C), PDM, I2S, PWM, ADC
- 10x16x1 mm SIP with 32 GPIO



nRF9160 10x16x1 mm SiP

The SW product



Power Consumption Example

- LTE-M connection
- 23 dBm output power
- 10 minutes downlink latency (eDRX)
- ~ 11 uA

15+ years battery life

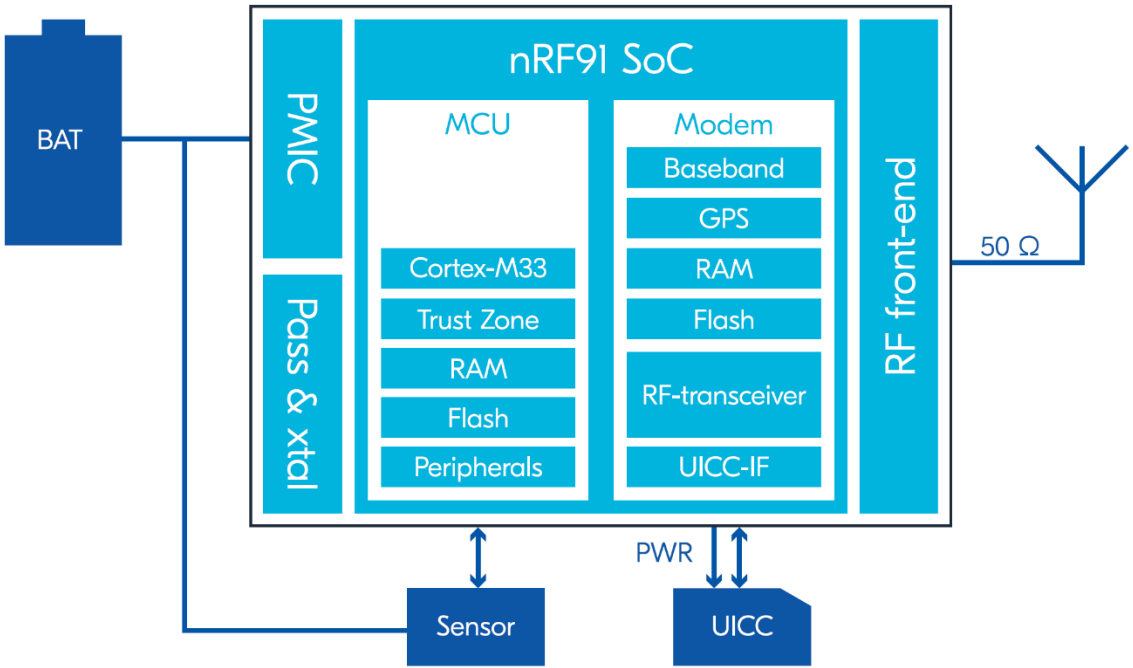
3.7 V, 2700 mAh

Power Consumption Example

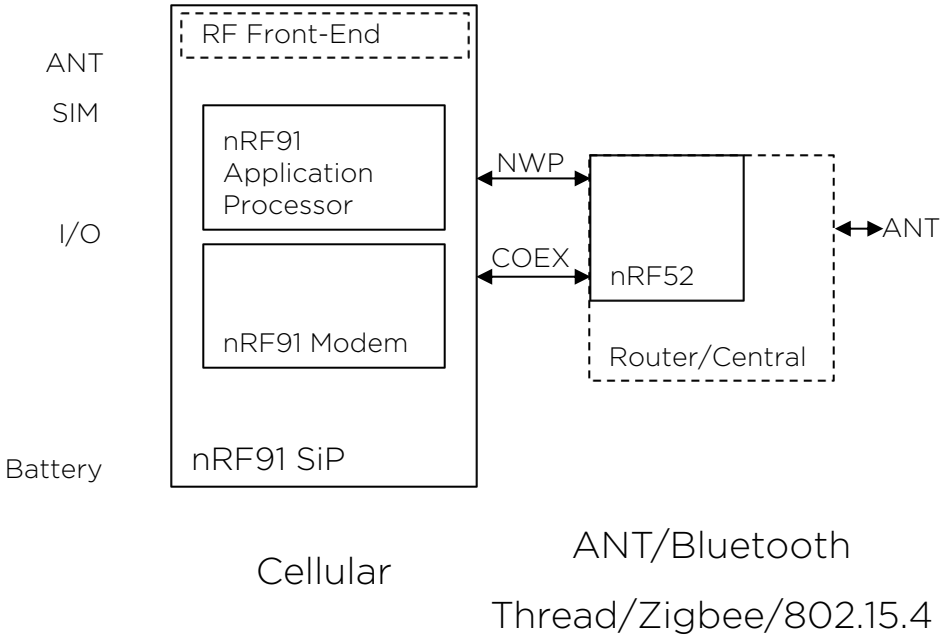
- LTE-M connection
- 23 dBm output power
- Sending tracking info every 20s (DRX)
- ~ 0.5 mA

6+ months battery life

3.7 V, 2700 mAh



Mix and match with short range

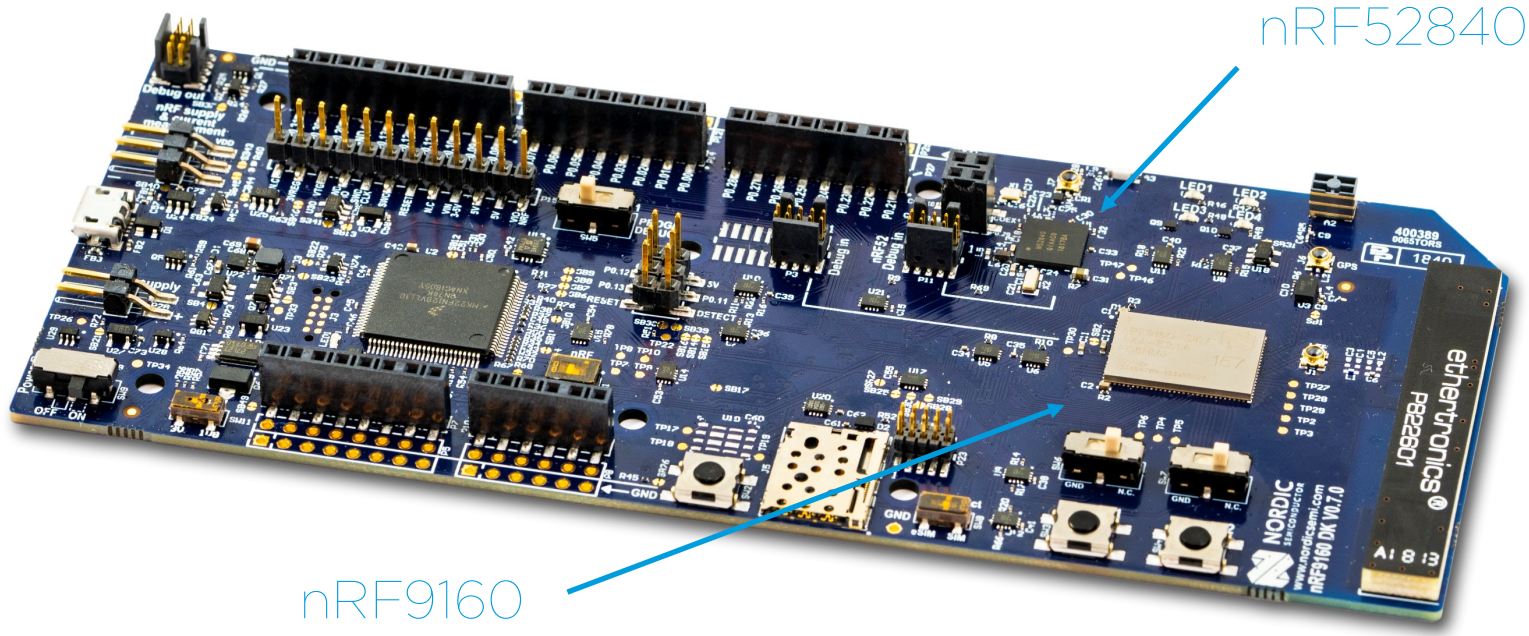


Chipset approach

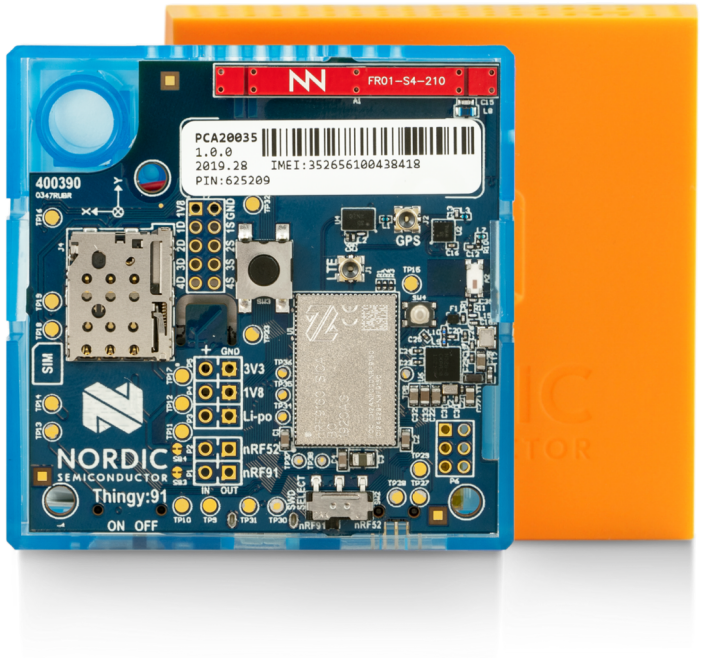
Automatic coexistence interface

Software drivers and sample application in the SDK

nRF9160 DK

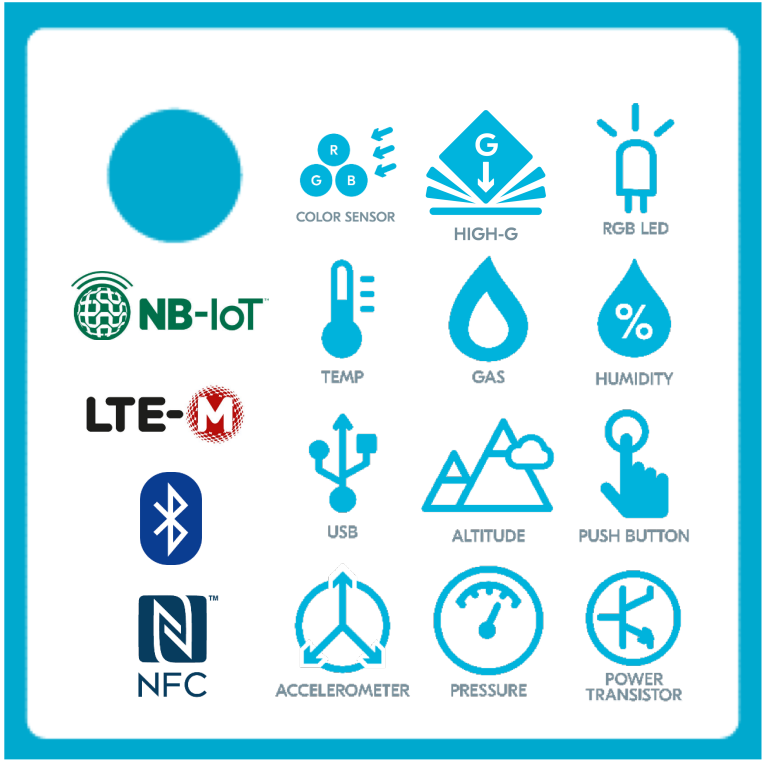


Thingy:91



Thingy:91

- cIoT: LTE-M and NB-IoT
- Short range: Bluetooth Low Energy
- Positioning: GPS
- Touch-to-pair: NFC
- Sensors: various
- Power: LiPo battery
- SIM: iBasis global roaming

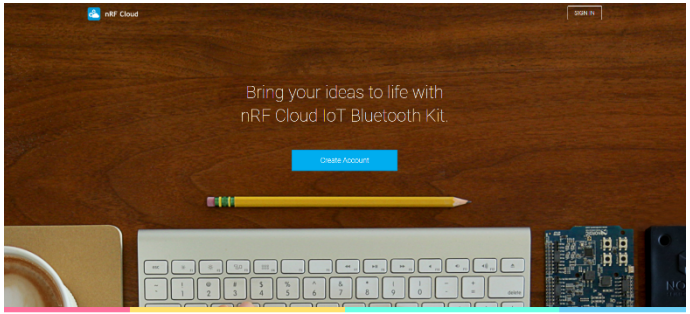


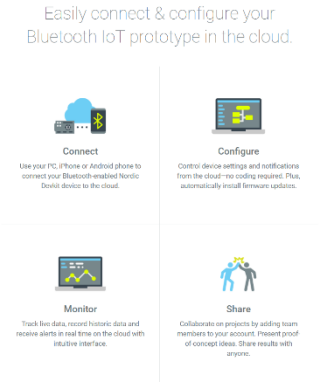
Asset tracker example

- Pre-loaded in Thingy:91
- GPS position + LTE-M
- Thingy:91 sensor data
- Relayed to nRF Connect for Cloud

Delivery Services

nRF Connect for Cloud





- IoT platform extension
- Connect – Develop - Deploy
- Cellular IoT
- Bluetooth Low Energy
- Built on AWS

Thank you ☺